

TENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 29 May 2001 (29.05.01)	
International application No. PCT/GB00/03872	Applicant's or agent's file reference P700159PCT/JG/SAC
International filing date (day/month/year) 09 October 2000 (09.10.00)	Priority date (day/month/year) 08 October 1999 (08.10.99)
Applicant TONKIN, Philip	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 17 April 2001 (17.04.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Pascal Piriou
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

TENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P700159PCT/JG/SAC	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 03872	International filing date (day/month/year) 09/10/2000	(Earliest) Priority Date (day/month/year) 08/10/1999
Applicant WABCO AUTOMOTIVE (UK) LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

1



None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

/GB 00/03872

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B60T17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B60T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	✓ FR 2 575 937 A (ROBERT BOSCH GMBH) 18 July 1986 (1986-07-18) page 3, line 3 -page 4, line 25; figure 1	1,10
A	✓ DE 43 25 102 A (IVECO MAGIRUS) 2 February 1995 (1995-02-02) column 1, line 54 -column 3, line 4; figure 1	1,10
A	✓ US 5 936 154 A (ROBERT H. NEELY) 10 August 1999 (1999-08-10)	

☐ Further documents are listed in the continuation of box C.


Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

4 January 2001

Date of mailing of the international search report

10/01/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
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Fax: (+31-70) 340-3016

Authorized officer

Harteveld, C

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

P/GB 00/03872

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2575937	A	18-07-1986	DE 3504884 A	17-07-1986
			KR 9208812 B	09-10-1992
			SE 465631 B	07-10-1991
			SE 8600170 A	17-07-1986
DE 4325102	A	02-02-1995	NONE	
US 5936154	A	10-08-1999	NONE	

Receipt is acknowledged of: April 2, 2002

In re the New National Phase Application of: Philip TONKIN

Based on International Application No.: PCT/GB00/03871 Filed: October 9, 2000

For: VEHICLE AIR BRAKING SYSTEMS

National Phase Application Transmittal and

WPO 01/26947 A1 (filed: October 9, 2000)

International Preliminary Examination Report

International Search Report

Information Disclosure Statement

One (1) Sheets of Drawings (Figs. 1-10)

Application Data Sheet

Check No.: 4444 for \$1300.00 (Filing)

JLC/sas
041618-71

Due Date

PLEASE DATE ST

NVA220779.1

10/089566

on Post CARD
PCT/GB00/03871

In Side Case

PCT/GB00/03872

REC'D 02 OCT 2001

WIPO

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P700159PCT/JG/SAC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/03872	International filing date (day/month/year) 09/10/2000	Priority date (day/month/year) 08/10/1999
International Patent Classification (IPC) or national classification and IPC B60T17/00		
Applicant WABCO AUTOMOTIVE (UK) LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 17/04/2001	Date of completion of this report 28.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Schmid, K Telephone No. +49 89 2399 8876 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/03872

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
- Description, pages:**

1-4 as originally filed

Claims, No.:

1-10 as originally filed

Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/03872

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-10
	No: Claims
Inventive step (IS)	Yes: Claims 1-10
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-10
	No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/03872

I. Basis of the report

The basis of this international preliminary examination report is the application as originally filed.

V. Statement

In light of the documents cited in the international search report, it is considered as obvious that the invention as claimed in the independent claims 1 and 10 meets the criteria mentioned in Article 33 (1) PCT, i.e. it appears to be novel, involve an inventive step and to be industrially applicable.

VII. Defects

A document reflecting the prior art described on page 1, is not identified in the description (Rule 5.1(a)(ii) PCT).

Independent claims 1 and 10 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art according to the description (page 1, lines 3 - 10) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P700159PCT/JG/SAC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/03872	International filing date (day/month/year) 09/10/2000	Priority date (day/month/year) 08/10/1999
International Patent Classification (IPC) or national classification and IPC B60T17/00		
Applicant WABCO AUTOMOTIVE (UK) LIMITED et al.		

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- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

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- I ☒ Basis of the report
- II ☐ Priority
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- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 17/04/2001	Date of completion of this report 28.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Schmid, K Telephone No. +49 89 2399 8876



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/03872

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):
- Description, pages:**

1-4 as originally filed

Claims, No.:

1-10 as originally filed

Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

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- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
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- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/0387

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-10
 No: Claims

Inventive step (IS) Yes: Claims 1-10
 No: Claims

Industrial applicability (IA) Yes: Claims 1-10
 No: Claims

2. Citations and explanations see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/03872

I. Basis of the report

The basis of this international preliminary examination report is the application as originally filed.

V. Statement

In light of the documents cited in the international search report, it is considered as obvious that the invention as claimed in the independent claims 1 and 10 meets the criteria mentioned in Article 33 (1) PCT, i.e. it appears to be novel, involve an inventive step and to be industrially applicable.

VII. Defects

A document reflecting the prior art described on page 1, is not identified in the description (Rule 5.1(a)(ii) PCT).

Independent claims 1 and 10 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art according to the description (page 1, lines 3 - 10) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

VEHICLE AIR BRAKING SYSTEMS

The present invention relates to vehicle air braking systems, and particularly to the removal of moisture from such systems.

A typical air braking system includes a compressor, an air dryer for compressor outlet air and a reservoir for pressurised air. The compressor output is directed via a non-return valve through the air dryer to the reservoir. The reservoir may comprise a purge volume and a service volume separated by a non return valve. Periodically dry air from the purge volume is directed back through the air dryer (which typically includes a bed of desiccant material) in order to purge the majority of moisture therefrom. Purging may be controlled by, for example a timer, and can occur after the compressor has been off load for a predetermined time.

It is important that moisture is periodically removed from the air dryer so as to prevent degradation of the desiccant bed, and corrosion of the air dryer and other components and conduits of the braking system. In periods of cold weather it is possible that moisture present in an air dryer overnight can freeze with the consequence that operation of the air dryer is impeded and/or the air dryer is damaged and/or the braking system rendered inoperable.

As described above, purging occurs after the compressor has been off load for a predetermined time. This presents a problems when purging the air dryer before a vehicle ceases to be used, for example when it is parked overnight. In bringing the vehicle to a standstill air is expended from the reservoir, and the resulting drop in reservoir pressure can bring the compressor on-load to replenish the reservoir. As a purge of the air dryer cannot be carried out while the compressor is on-load, the vehicle engine must be run until the compressor goes off-load before the air dryer can be purged. Consequently a vehicle driver must remain in the vehicle with the engine running until the reservoir is replenished. Such a procedure is both wasteful of the driver's time and vehicle fuel, and thus often the system is not purged at the end of the working day, as would be desirable.

According to the present invention there is provided a vehicle air braking system including an air compressor, an air dryer, an air dryer control valve having a vent to atmosphere, a reservoir adapted to contain a quantity of dry air for use in regenerating desiccant of the air dryer and means to exhaust the dry air through the desiccant and control valve to atmosphere, the system further including control means sensitive to the operating condition of the vehicle and operable to cause regeneration of the desiccant and purging of the control valve when the vehicle engine is stopped.

The control means of the present invention sense when operation of the vehicle ceases, for example when it is parked, and automatically regenerates the desiccant to remove moisture therein. This eliminates the need for the driver of the vehicle to keep the engine running and wait for the compressor to go off load. By regenerating the desiccant automatically on vehicle shutdown, the possibility that the desiccant may be damaged by the freezing of moisture therein is reduced. Moisture which may be present in venting ducts, control valve passageways or in the air dryer body is also expelled, which reduces the possibility of the subsequent operation of the venting system being hampered or prevented by ice.

A further advantage of the invention is that automatic regeneration at the end of the working day necessarily leaves the desiccant in a dry condition. In turn this can reduce the time to pump up the system on the following day since an intermediate regeneration might be avoided. Such an intermediate regeneration would interrupt charging if the air dryer remained in a relatively wet condition at the end of the previous working day, and become saturated part way through initial charging. Intermediate regeneration could be triggered by for example moisture sensing or the sensing of volume pumped since the previous regeneration.

In a preferred embodiment the control means are operable to open the control valve vent of the air braking system, and preferably to close the vent once regeneration has taken place. Closure of the vent isolates the control valve and desiccant from atmosphere and prevents the ingress of matter such as dust and insects, and further prevents degradation of the desiccant via moisture in the ambient atmosphere. The control means may be responsive to the state of the vehicle ignition system. The vent may open against a resilient bias and thus automatically return to the closed condition after regeneration. Such an arrangement

ensures that the braking system is closed against ingress of moisture through the vent valve whilst in a passive condition.

Preferably the control valve is switchable between an inlet position, where air received at an inlet thereof passes to the reservoir via the desiccant, and an exhaust position where air in the reservoir is permitted to flow through the desiccant and control valve vent to atmosphere. The control valve can thus be used for both periodic regeneration of the desiccant when the vehicle is in use and purging of the system at the end of the working day. In a preferred embodiment the control valve and vent are provided in a common housing of the air dryer. It will be appreciated that such an arrangement eliminates the need for additional piping to be provided between control valve, vent and air dryer which reduces the size of the system and complexity. By positioning the control valve intermediate a desiccant chamber of the air dryer and the vent, it is ensured that the control valve is purged of any moisture contained therein. In a preferred embodiment the reservoir surrounds the air dryer.

The invention also provides a method of regenerating an air dryer of a vehicle air braking system and purging a control valve of the air dryer at the end of the working day, the method comprising the steps of:

- determining that the vehicle engine is stopped;
- connecting a regeneration reservoir of dry air to the air dryer;
- connecting the air dryer and control valve to atmosphere; and
- backflushing the air dryer and control valve to remove moisture therefrom.

Such a method may be used in an existing air dryer installation by suitable control of system components.

An embodiment of the present invention will now be described with reference to the accompanying drawing (Figure 1) which shows cross sectional representation of combined reservoir and dryer assembly according to the present invention.

The assembly, generally designated 10, comprises an airtight container 12 having an inlet 14 and an outlet 16. The inlet 14 is closed by a control valve 18. The outlet 16 is closable

in use by a demand valve of the air braking system (not shown) within which the component is incorporated. The container 12 is provided with an internal partition 20 dividing the interior thereof into two chambers; a service chamber 22 and a purge chamber 24. A non-return valve 26 of the partition 20 permits one way fluid communication from the purge chamber 24 to the service chamber 22.

A desiccant compartment 28 is located downstream of the inlet 14 within the purge chamber 24. A passageway 30 having a non-return valve 32 is arranged between the desiccant compartment 28 and the purge chamber 24. The non-return valve 32 is arranged such that air can pass from the inlet 14 through the desiccant compartment 28 and into the purge chamber 24 but not in the reverse direction. The desiccant compartment 28 is further provided with a second passageway 34 with a restriction 36 therein.

The control valve 18 is switchable between an inlet position and an exhaust position. The inlet position permits air received from the inlet to pass first into the purge chamber 24 via the desiccant compartment 28 and thereafter to the service chamber 22 via the non-return valve 26. The exhaust position of the control valve 18 permits air in the purge chamber 24 to flow through the desiccant compartment 28 and out to atmosphere via a vent 38 in the control valve housing.

The control valve 18 is connected to a controller 40 which under normal operating conditions periodically moves the control valve 18 to the exhaust position to permit regeneration of the desiccant in the desiccant chamber 28 by the dry air in the purge chamber 24. The controller is sensitive to the condition of the compressor (not shown) so that regeneration will not take place when the compressor is on load. According to the present invention the controller 40 is also operable so as to move the control valve 18 to the exhaust position when use of the vehicle ceases. For example, the controller may be sensitive to the vehicle's ignition system such that when the ignition system is switched off the control valve moves to the exhaust position and the desiccant is regenerated. The control valve 18 then reverts to the inlet position ready to receive air from the compressor when the vehicle is reactivated.

Claims

1. A vehicle air braking system including an air compressor, an air dryer, an air dryer control valve having a vent to atmosphere, a reservoir adapted to contain a quantity of dry air for use in regenerating desiccant of the air dryer and means to exhaust dry air through the desiccant and control valve to atmosphere, the system further including control means sensitive to the operating condition of the vehicle and operable to cause regeneration of the desiccant and purging of the control valve when the vehicle engine is stopped.
2. A system according to claim 1 wherein said control means are operable to opens aid vent of the control valve.
3. A system according to claim 2 wherein said control means are operable to close said vent after regeneration.
4. A system according to claim 2 or claim 3 wherein said control valve is a valve operated by a solenoid.
5. A system according to any preceding claim wherein said control means is responsive to a state of the vehicle ignition system.
6. A system according to any preceding claim wherein the control valve is switchable between an inlet position, where air received at an inlet thereof passes to the reservoir via the desiccant, and an exhaust position where air in the reservoir is permitted to flow through the desiccant and control valve vent to atmosphere.
7. A system as claimed in any preceding claim wherein the control valve and vent are provided in a common housing of the air dryer.
8. A system as claimed in any preceding claim wherein the control valve is intermediate a desiccant chamber of the air dryer and the vent.
9. A system as claimed in any preceding claim wherein the reservoir surrounds the air dryer.
10. A method of regenerating an air dryer of a vehicle air braking system and purging a control valve of the air dryer at the end of the working day, the method comprising the steps of:
 - determining that the vehicle engine is stopped;
 - connecting a regeneration reservoir of dry air to the air dryer;
 - connecting the air dryer and control valve to atmosphere; and
 - backflushing the air dryer and control valve to remove moisture therefrom.

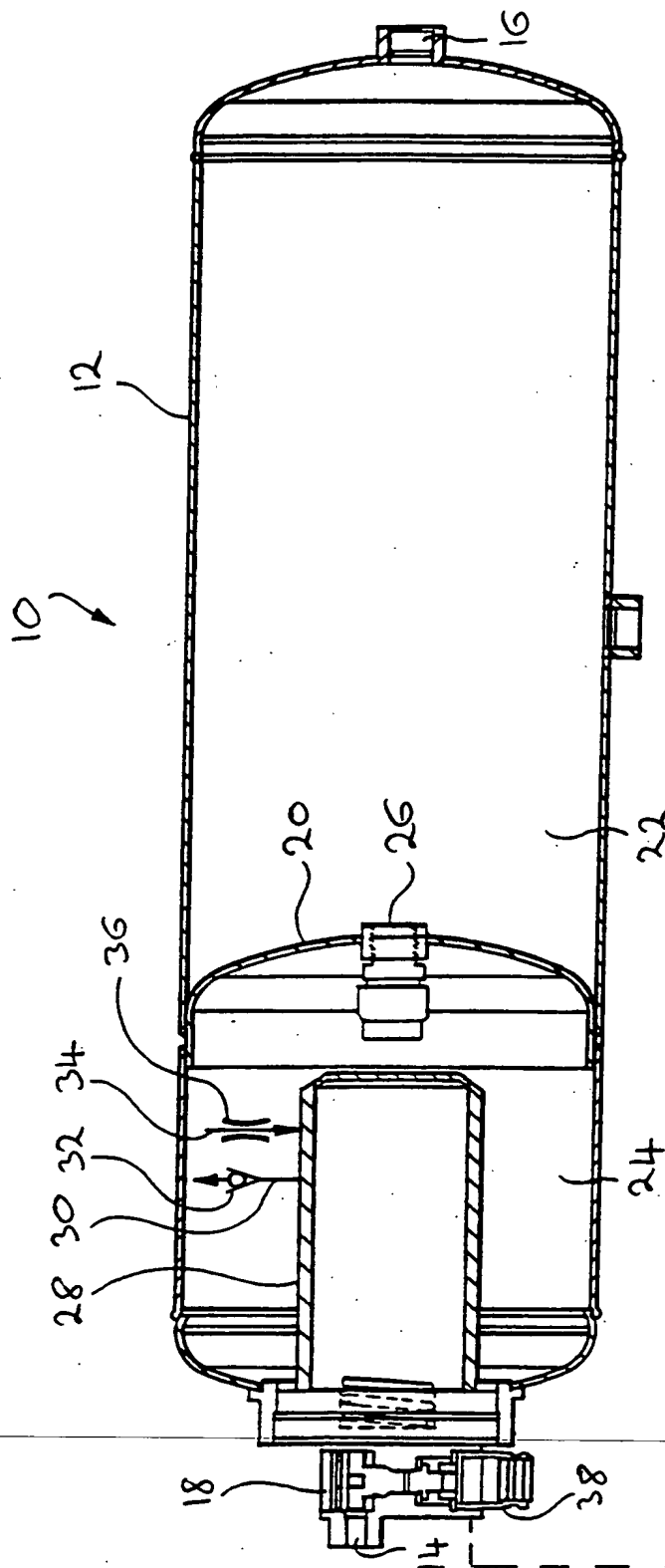


Fig. 1

40

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/03872

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B60T17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B60T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 575 937 A (ROBERT BOSCH GMBH) 18 July 1986 (1986-07-18) page 3, line 3 -page 4, line 25; figure 1 ---	1,10
A	DE 43 25 102 A (IVECO MAGIRUS) 2 February 1995 (1995-02-02) column 1, line 54 -column 3, line 4; figure 1 ---	1,10
A	US 5 936 154 A (ROBERT H. NEELY) 10 August 1999 (1999-08-10) -----	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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Information on patent family members

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